AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (currently amended) A method for exciting resonance in a plurality of atoms at an atomic frequency of the plurality of atoms, the method comprising the steps of:

frequency modulating a coherent light source with a modulation frequency whose n-th harmonic is said atomic frequency, with n being an integer substantially larger than two, to provide a lightwave, the lightwave having two coherent optical fields with a frequency separation substantially equal to the atomic frequency; and

directing the lightwave at the plurality of atoms.

2. (original) The method of claim 1, further comprising the step of changing the modulation frequency to adjust the frequency separation of the two coherent optical fields.

3. (original) The method of claim 2, further comprising the step of locking the modulation frequency when the frequency separation of the two coherent optical fields is substantially equal to the atomic frequency.

4. (original) The method of claim 1, wherein the step of frequency modulating comprises frequency modulating the coherent light source with a sine wave at the modulation frequency.

5. (original) The method of claim 1, wherein the step of frequency modulating comprises frequency modulating the coherent light source with a square wave at the modulation frequency.

6. (original) The method of claim 5, further comprising the step of adjusting the amplitude of the square wave, thereby localizing about 50% of the energy in the lightwave at the two coherent optical fields.

7. (original) The method of claim 1, wherein the modulation frequency is provided without using up-converting hardware.

8. (currently amended) An apparatus for exciting resonance in a plurality of atoms at an atomic frequency of the plurality of atoms, the apparatus comprising:

a coherent light source that directs a lightwave at the plurality of atoms; and

an oscillator that frequency modulates the coherent light source with a modulation frequency whose n-th harmonic is said atomic frequency, with n being an integer substantially larger than two, to generate the lightwave, wherein the lightwave contains two coherent optical fields having a frequency separation substantially equal to the atomic frequency.

9. (original) The apparatus of claim 8, wherein the modulation frequency is changed to adjust the frequency separation of the two coherent optical fields.

10. (original) The apparatus of claim 9, wherein the modulation frequency is locked when the frequency separation of the two coherent optical fields is substantially equal to the atomic frequency.

11. (original) The apparatus of claim 8, wherein the oscillator frequency modulates the light source at the modulation frequency with a sine wave.

12. (original) The apparatus of claim 8, wherein the oscillator frequency modulates the light source at the modulation frequency with a square wave.

13. (original) The apparatus of claim 12, wherein the amplitude of the square wave is

adjusted to localize about 50% of the energy in the lightwave at the two coherent optical fields.

14. (original) The apparatus of claim 8, wherein the modulation frequency is provided without the use of up-converting hardware.

15. (currently amended) An apparatus for exciting resonance in a plurality of atoms at an atomic frequency of the plurality of atoms, the apparatus comprising:

means for directing a lightwave at the plurality of atoms; and

means for frequency modulating the means for directing a lightwave with a modulation frequency whose n-th harmonic is said atomic frequency, with n being an integer substantially larger than two, wherein the lightwave contains two coherent optical fields having a frequency separation substantially equal to the atomic frequency.

16. (original) The apparatus of claim 15, wherein the modulation frequency is changed to adjust the frequency separation of the two coherent optical fields.

17. (original) The apparatus of claim 16, wherein the modulation frequency is locked when the frequency separation of the two coherent optical fields is substantially equal to the atomic frequency.

18. (original) The apparatus of claim 15, wherein the means for frequency modulating frequency modulates the means for directing a lightwave at the modulation frequency with a sine wave.

19. (original) The apparatus of claim 15, wherein the means for frequency modulating frequency modulates the means for directing a lightwave at the modulation frequency with a square wave.

20. (original) The apparatus of claim 19, wherein the amplitude of the square wave is adjusted to localize about 50% of the energy in the lightwave at the two coherent optical fields.

21. (original) The apparatus of claim 15, wherein the modulation frequency is provided without the use of up-converting hardware.

22. (new) The method of claim 1, further comprising a step of locating a desired amount of energy in the lightwave at the two coherent optical fields.

23. (new) The method of claim 22, wherein said desired amount of energy is a substantial portion of energy.

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